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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/134,478	08/14/1998	TAKAFUMI NOGUCHI	2091-0162P	8041

2292 7590 02/08/2005

BIRCH STEWART KOLASCH & BIRCH
PO BOX 747
FALLS CHURCH, VA 22040-0747

EXAMINER	
HENN, TIMOTHY J	

ART UNIT	PAPER NUMBER
2612	

DATE MAILED: 02/08/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)	
	09/134,478	NOGUCHI, TAKAFUMI	
	Examiner	Art Unit	
	Timothy J Henn	2612	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *10 September 2004*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-19* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☒ Claim(s) *17* is/are allowed.

6)☒ Claim(s) *1-16,18 and 19* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on *02 January 2003* is/are: a)☒ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☒ All b)☐ Some * c)☐ None of:

1.☒ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____.
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: _____.

DETAILED ACTION

1. Please note that the examiner of record has changed. All future correspondence should be directed to Timothy J. Henn whose information is provided at the end of this office action.

Response to Arguments

2. Applicant's arguments, see reply, filed 10 September 2004, with respect to the rejection(s)of the claim(s) have been fully considered and are persuasive. Therefore, the rejection has been withdrawn. However, upon further consideration, a new ground(s) of rejection is made in view of Asaida (US 4,943,850), Lu et al. (US 5,504,524) and Kim (US 6,018,588).

Claim Rejections - 35 USC § 112

3. The following is a quotation of the first paragraph of 35 U.S.C. 112:

> The specification shall contain a written description of the invention, and of the manner and process of making and using it; in such full, clear, concise, and exact terms as to enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to make and use the same and shall set forth the best mode contemplated by the inventor of carrying out his invention.

4. Claims 1-8, 10-12 and 17 are rejected under 35 U.S.C. 112, first paragraph, as failing to comply with the enablement requirement. The claim(s) contains subject matter which was not described in the specification in such a way as to enable one skilled in the art to which it pertains, or with which it is most nearly connected, to make and/or use the invention.

[claims 1-8, 10-12 and 17]

Claims 1-8, 10-12 and 17 contain the limitation "determining a rate of pixels based on a number of pixels having a maximum brightness among all pixels, wherein the maximum brightness among all pixels is taken from a group of commonly encountered brightness; and automatically making an adjustment to said pixel value based on the rate", however this process is not contained within the specification. As can be seen from figure 2 and pages 15-16 of the specification, a rate of pixels based on a number of pixels having a maximum brightness is not used as a basis for making an adjustment to the pixel value. Instead, a brightness value t is determined such that a certain percentage of the pixels have a brightness higher than t, and a correction factor k is determined. This process involves looking at the rates of pixels at multiple brightness values higher than t, rather than a single maximum brightness value as claimed.

[claims 2-4 and 8]

Referring to claims 2-4 and 8, the applicant claims an adjustment made to said pixel value based on the rate of pixels having a maximum brightness among all pixels in claim 1 and an adjustment to the exposure value of the image acquisition device in claims 2-4.

However there is no support in the specification for an adjustment made to the image acquisition device and the pixel values based on the rate of pixels having the maximum brightness among all pixels. Instead the specification discloses two embodiments where a pre-photography adjustment is made to the camera based on the brightness of the previously captured image, or that an adjustment is made to a

captured image based on the number of pixels having the maximum brightness determined by calculating a cumulative histogram of all the pixels in the captured image.

[claims 3, 4, 8 and 10-12]

Regarding claims 3, 4, 8 and 10-12, the applicant claims adjusting an exposure value of an image acquisition device using an equation relating an adjusted set of RGB values to the original set of RGB values by multiplying by a factor k in linear scale or adding a factor k in logarithmic scale. However, it is noted that exposure value EV is a number relating the aperture size, shutter speed and sensitivity of the image pickup element. It is unclear from the specification how this value can be changed through mathematical operations on the image data.

Claim Rejections - 35 USC § 103

5. The text of those sections of Title 35, U.S. Code not included in this action can be found in a prior Office action.

6. Claims 1, 2, 5-8, 13-16 and 19 are rejected under 35 U.S.C. 103(a) as being unpatentable over Asaida (US 4,943,850) in view of Lu et al. (US 5,504,524) in view of Kim (US 6,018,588).

[claim 1]

Regarding claim 1, Asaida discloses acquiring image data by an image acquisition device (Figure 4) and expressing a pixel value of each pixel in the image data as a set of three mutually independent components (c. 3, ll. 26-34). However, Asaida does not disclose defining the brightness of each pixel based on the three

components, determining a rate of pixels based on a number of pixels having a maximum brightness and automatically making an adjustment to the pixel value based on the rate.

Lu discloses exposure control for an imaging device in which pixel values are compared to four threshold levels to determine if any of the R, G or B pixel values are above or below the threshold. Based on these comparisons, counts are maintained of the number of pixels having brightness values within predetermined ranges (i.e. a histogram) and a check is made to see if a number of pixels having a maximum brightness is greater than a predetermined rate (i.e. N(1)>1%). If an image is then found to be over-exposed, an adjustment to a camera iris or exposure time is made to ensure correct exposure (c. 6, l. 26 - c. 7, l. 25). Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to implement the exposure control method of Lu in the camera of Asaida to ensure correct exposure when taking images. However, Asaida in view of Lu lacks automatic adjustments to the pixel value and instead alters camera exposure settings.

Kim teaches that it is well known to provide a pipeline processing technique to perform a brightness adjustment on a captured image. Kim discloses a method of brightness adjustment using the processing circuit in figure 5 where each acquired pixel is expressed as red, green, and blue component values and a histogram is computed for the luminous value of each pixel in the image data. A correction value for the luminous signal of each pixel is calculated and is automatically applied to the three RGB pixel components (Col. 8, Lines 41 – 57).

Therefore it would have been obvious to use the pipeline processing teachings of Kim and provide an automatic means of adjusting the current captured image instead of making adjustments to the camera for future images thereby eliminating the need for capturing multiple images and insures that a desired image can be captured without having to recalibrate the camera to adjust brightness thereby missing an opportune photographic moment.

[claim 2]

Regarding claim 2, Lu discloses adjusting the exposure value of the camera at the time of photography (c. 6, l. 26 - c. 7, l. 25).

[claim 5]

Regarding claim 5, Asiada discloses an image acquisition device which acquires images as digital data (Figure 4, A/D) as well as processing the image as digital data. Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to perform the processing of Kim in the digital domain.

[claim 6]

Regarding claim 6, Asiada in view of Lu in view of Kim teaches adjusting pixel rates according to a rate of pixels having a maximum brightness. Kim further teaches modifying image brightness according to the equation: (R', G', B') = k(R, G, B). In the combination of Asiada in view of Lu in view of Kim, it would therefore be obvious to base the factor k according to the determined rate of pixels to achieve a final image with proper exposure.

[claim 7]

Regarding claim 7, Asiada in view of Lu in view of Kim teaches adjusting pixel rates according to a rate of pixels having a maximum brightness, but does not teach the use of the equation (R', G', B') = (R, G, B) + k in logarithmic scale. Official Notice is taken that the conversion of data to logarithmic scale to substitute a multiplication step for an addition step is notoriously well known in the signal processing art to reduce hardware requirements since logarithmic conversion and addition circuits require less logic than multiplication circuits. Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to use the equation (R', G', B') = (R, G, B) + k in logarithmic scale instead of (R', G', B') = k(R, G, B) as used by Kim to reduce the required circuitry.

[claim 8]

Regarding claim 8, Lu teaches comparing a pixel's individual R, G and B values to a threshold to create an exposure or "brightness" histogram. If any R, G or B value exceeds the threshold, the pixel is considered to be over-exposed or too bright (i.e. max(R, G, B) > threshold).

[claim 13]

Regarding claim 13, Asiada discloses a data acquisition for acquiring image data in which a pixel value of each pixel is expressed as a set of three mutually independent components (Figure 4; c. 3, ll. 26-34). However, Asiada lacks brightness analyzing means and exposure control means as claimed.

Lu discloses exposure control for an imaging device in which pixel values are compared to four threshold levels to determine if any of the R, G or B pixel values are

above or below the threshold. Based on these comparisons, counts are maintained of the number of pixels having brightness values within predetermined ranges (i.e. a brightness histogram based on said three color components) and a check is made to see if a number of pixels having a maximum brightness is greater than a predetermined rate (i.e. N(1)>1%). If an image is then found to be over-exposed, an adjustment to a camera iris or exposure time is made to ensure correct exposure (c. 6, l. 26 - c. 7, l. 25). In Lu, a correctly exposed (i.e. not over-exposed or under-exposed) image is an image in which a rate of pixels having a maximum brightness is at a pre-determined rate (i.e. N(1) < 1%). Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to implement the exposure control method of Lu in the camera of Asaida to ensure correct exposure when taking images. However, Asaida in view of Lu lacks automatic adjustments to the pixel value and instead alters camera exposure settings.

Kim teaches that it is well known to provide a pipeline processing technique to perform a brightness adjustment on a captured image. Kim discloses a method of brightness adjustment using the processing circuit in figure 5 where each acquired pixel is expressed as red, green, and blue component values and a histogram is computed for the luminous value of each pixel in the image data. A correction value for the luminous signal of each pixel is calculated and is automatically applied to the three RGB pixel components (Col. 8, Lines 41 – 57).

Therefore it would have been obvious to use the pipeline processing teachings of Kim and provide an automatic means of adjusting the current captured image instead of

making adjustments to the camera for future images thereby eliminating the need for capturing multiple images and insures that a desired image can be captured without having to recalibrate the camera to adjust brightness thereby missing an opportune photographic moment.

[claim 14]

Regarding claim 14, Asiada in view of Lu in view of Kim teaches adjusting pixel rates according to a rate of pixels having a maximum brightness. Kim further teaches modifying image brightness according to the equation: (R', G', B') = k(R, G, B). In the combination of Asiada in view of Lu in view of Kim, it would therefore be obvious to base the factor k according to the determined rate of pixels to achieve a final image with proper exposure.

[claim 15]

Regarding claim 15, Asiada in view of Lu in view of Kim teaches adjusting pixel rates according to a rate of pixels having a maximum brightness, but does not teach the use of the equation (R', G', B') = (R, G, B) + k in logarithmic scale. Official Notice is taken that the conversion of data to logarithmic scale to substitute a multiplication step for an addition step is notoriously well known in the signal processing art to reduce hardware requirements since logarithmic conversion and addition circuits require less logic than multiplication circuits. Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to use the equation (R', G', B') = (R, G, B) + k in logarithmic scale instead of (R', G', B') = k(R, G, B) as used by Kim

to reduce the required circuitry.

[claim 16]

Regarding claim 16, Lu teaches comparing a pixel's individual R, G and B values to a threshold to create an exposure or "brightness" histogram. If any R, G or B value exceeds the threshold, the pixel is considered to be over-exposed or too bright (i.e. max(R, G, B) > threshold).

[claim 19]

Regarding claim 19, Asiada discloses a data acquisition for acquiring image data in which a pixel value of each pixel is expressed as a set of three mutually independent components (Figure 4; c. 3, ll. 26-34). However, Asiada lacks brightness analyzing means and exposure control means as claimed.

Lu discloses exposure control for an imaging device in which pixel values are compared to four threshold levels to determine if any of the R, G or B pixel values are above or below the threshold. Based on these comparisons, counts are maintained of the number of pixels having brightness values within predetermined ranges (i.e. a brightness histogram based on said three color components) and a check is made to see if a number of pixels having a maximum brightness is greater than a predetermined rate (i.e. N(1)>1%). If an image is then found to be over-exposed, an adjustment to a camera iris or exposure time is made to ensure correct exposure (c. 6, l. 26 - c. 7, l. 25). In Lu, a correctly exposed (i.e. not over-exposed or under-exposed) image is an image in which a rate of pixels having a maximum brightness is at a pre-determined rate (i.e. N(1) < 1%). Therefore, it would have been obvious to one of ordinary skill in the art at

the time the invention was made to implement the exposure control method of Lu in the camera of Asaida to ensure correct exposure when taking images. However, Asaida in view of Lu lacks automatic adjustments to the pixel value and instead alters camera exposure settings.

Kim teaches that it is well known to provide a pipeline processing technique to perform a brightness adjustment on a captured image. Kim discloses a method of brightness adjustment using the processing circuit in figure 5 where each acquired pixel is expressed as red, green, and blue component values and a histogram is computed for the luminous value of each pixel in the image data. A correction value for the luminous signal of each pixel is calculated and is automatically applied to the three RGB pixel components (Col. 8, Lines 41 – 57).

Therefore it would have been obvious to use the pipeline processing teachings of Kim and provide an automatic means of adjusting the current captured image instead of making adjustments to the camera for future images thereby eliminating the need for capturing multiple images and insures that a desired image can be captured without having to recalibrate the camera to adjust brightness thereby missing an opportune photographic moment.

While it is noted that Asiada in view of Lu lacks brightness analyzing means which uses chrominance values, it is noted that Asiada in view of Lu meets the limitations of the claim structurally. Since apparatus claims must be distinguishable from the prior art in terms of structure rather than function, the rejection based on

Asiada in view of Lu is considered proper (See MPEP §2114).

7. Claims 9, 12 and 18 are rejected under 35 U.S.C. 103(a) as being unpatentable over Asiada (4,943,850) in view of Lu et al. (US 5,504,524).

[claim 9]

Regarding claim 9, Asiada discloses a digital camera comprising image pick-up means for photographing an image and acquiring image data in which a pixel value of each pixel is expressed as a set of three mutually independent components (Figure 4; c. 3, ll. 26-34). However, Asiada lacks brightness analyzing means and exposure control means as claimed.

Lu discloses exposure control for an imaging device in which pixel values are compared to four threshold levels to determine if any of the R, G or B pixel values are above or below the threshold. Based on these comparisons, counts are maintained of the number of pixels having brightness values within predetermined ranges (i.e. a brightness histogram based on said three color components) and a check is made to see if a number of pixels having a maximum brightness is greater than a predetermined rate (i.e. N(1)>1%). If an image is then found to be over-exposed, an adjustment to a camera iris or exposure time is made to ensure correct exposure (c. 6, l. 26 - c. 7, l. 25). In Lu, a correctly exposed (i.e. not over-exposed or under-exposed) image is an image in which a rate of pixels having a maximum brightness is at a pre-determined rate (i.e. N(1) < 1%). Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to implement the exposure control method of Lu in the

camera of Asaida to ensure correct exposure when taking images.

[claim 12]

Regarding claim 12, Lu teaches comparing a pixel's individual R, G and B values to a threshold to create an exposure or "brightness" histogram. If any R, G or B value exceeds the threshold, the pixel is considered to be over-exposed or too bright (i.e. max(R, G, B) > threshold).

[claim 18]

Regarding claim 18, Asiada discloses a digital camera comprising image pick-up means for photographing an image and acquiring image data in which a pixel value of each pixel is expressed as a set of three mutually independent components (Figure 4; c. 3, ll. 26-34). However, Asiada lacks brightness analyzing means and exposure control means.

Lu discloses exposure control for an imaging device in which pixel values are compared to four threshold levels to determine if any of the R, G or B pixel values are above or below the threshold. Based on these comparisons, counts are maintained of the number of pixels having brightness values within predetermined ranges (i.e. a brightness histogram based on said three color components) and a check is made to see if a number of pixels having a maximum brightness is greater than a predetermined rate (i.e. N(1)>1%). If an image is then found to be over-exposed, an adjustment to a camera iris or exposure time is made to ensure correct exposure (c. 6, l. 26 - c. 7, l. 25). In Lu, a correctly exposed (i.e. not over-exposed or under-exposed) image is an image in which a rate of pixels having a maximum brightness is at a pre-determined rate (i.e.

N(1) < 1%). Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to implement the exposure control method of Lu in the camera of Asaida to ensure correct exposure when taking images.

While it is noted that Asiada in view of Lu lacks brightness analyzing means which uses chrominance values, it is noted that Asiada in view of Lu meets the limitations of the claim structurally. Since apparatus claims must be distinguishable from the prior art in terms of structure rather than function, the rejection based on Asiada in view of Lu is considered proper (See MPEP §2114).

Allowable Subject Matter

8. Claim 17 is allowed.

[claim 17]

Regarding claim 17, the prior art does not teach or fairly suggest a method of adjusting the brightness of an image by defining a brightness based on pixel chrominance values and automatically adjusting the pixel value based on a rate of pixels having a maximum brightness among all pixels as claimed.

9. Claims 3, 4, 7, 10 and 11 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

[claims 3, 4, 10 and 11]

Regarding claims 3, 4, 10 and 11, the prior art does not teach or fairly suggest changing an exposure value of a camera or image capturing system through the use of the equation (R', G', B') = k(R, G, B) or (R', G', B') = (R, G, B) + k as claimed.

Conclusion

10. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Timothy J Henn whose telephone number is (703) 305-8327 or (571) 272-7310 after 28 February 2005. The examiner can normally be reached on M-F 9:00 AM - 6:00 PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Wendy R Garber can be reached on (703) 305-4929. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

TJH

WENDY R. GARBER
SUPERVISORY PATENT EXAMINER
TECHNOLOGY CENTER 2600